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International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : H01L 21/762

A3

(11) International Publication Number: WO 99/62108

(43) International Publication Date: 2 December 1999 (02.12.99)

(21) International Application Number: PCT/IB99/00835

(22) International Filing Date: 10 May 1999 (10.05.99)

(30) Priority Data:
98401232.8 22 May 1998 (22.05.98) EP

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(81) Designated States: JP, KR, SG, US.

Published
With international search report.

(88) Date of publication of the international search report:
27 January 2000 (27.01.00)

(54) Title: METHODS FOR FORMING SELF–PLANARIZED DIELECTRIC LAYER FOR SHALLOW TRENCH ISOLATION

(57) Abstract

A method for depositing a trench oxide filling layer (300) on a trenched substrate (224) utilizes the surface sensitivity of dielectric materials such as O_3/TEOS. Such materials have different deposition rates on differently constituted surfaces at different levels on the trenched substrate (224) so that the surface profile of the deposited layer (300) is substantially self–planarized. Depositing the dielectric material on a silicon trench (228) produces a high quality filling layer, and cleaning the trench (228) prior to deposition can increase the quality. After deposition, an oxidizing anneal can be performed to grow a thermal oxide (308) at the trench surfaces and densify the dielectric material. A chemical mechanical polish can be used to remove the excess oxide material above an etch stop layer (226) of the substrate (224) which can be formed of LPCVD nitride or CVD anti–reflective coating.